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Hardiness as a moderator variable between the Big-Five Model and work effort

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ABSTRACT

The aim of the present study is to analyse hardiness as a moderator variable among personality traits, assessed using the Big-Five or Five Factor Model (FFM) and responses in work effort of workers confronted with stress. Using a multi-occupational sample of 403 subjects, statistically significant correlations between the factors of the FFM and work effort were found, as well as between hardiness and effort, as predicted by the theoretical model. Finally, empirical evidence indicates that hardiness performs a moderating role between the factors of FFM and effort displayed, in the sense that hardiness (understood as a quantitative variable) affects the intensity of the relationship between the structure of personality (predictor variable) and work effort (criterion variable), that is, even taking into account that personality structure affects work effort, people who score high in hardiness will show more effort.

1. Introduction

The main objective of the present study is to analyse the relationship between personality traits, assessed using the Big Five or Five Factor Model (FFM), and responses in work effort when confronted with stress, as well as the moderating effect of hardiness.

In the study of the relationships between personality traits and responses to stress, some researchers have included specific constructs, such as Type A (Friedman, 1991), hostility (Suls & Wan, 1993), or optimism (Scheier & Carver, 1992). However, a wider perspective in the study of personality is offered by the Big Five Model (Grant & Langan-Fox, 2006; Penley & Tomaka, 2002).

This introduction is organised as follows. Firstly, the three main variables considered are outlined: hardiness, personality traits assessed through the FFM, and work effort. Then, a theoretical proposal on the relationships between these variables is presented, and finally, several specific hypotheses to test in an empirical study are formulated.

1.1. Hardiness

One important personality variable studied in relation to stress is hardiness or hardy personality (Delajaih, Gaillard, & van Dam, 2010; Moreno-Jiménez, Garrosa, Corso, Boada, & Rodríguez-Carvajal, 2012). The concept of hardiness was introduced by Kobasa (1979), who perceived it as a construct of three components: control, commitment, and challenge.

Hardiness is an attribute of certain people that allows them to respond effectively to stress demands, to perform better (Bartone, Eid, Johnsen, Laberg, & Snook, 2009), and to stay healthier (Soderstrom, Dolbier, Leifeman, & Steinhardt, 2000). Kobasa identified the possible moderating role of hardiness between stressful situations and healthy responses to stress. Therefore, a moderating effect of hardiness between personality traits and work effort, as a means of challenging stress demands in the workplace is expected.

Currently, hardiness continues to arouse great interest among researchers, extending their interest to a type of variable which itself may be moderated by other variables (Delajaih et al., 2010).

Other studies have demonstrated the influence of hardiness on the degree of burnout experienced by nurses when attempting to reduce their susceptibility to it (Garrosa, Moreno-Jiménez, Liang, & González, 2008). Definitively, the concept of hardiness is becoming one of the most important factors for protecting physical and psychological health when faced with adverse situations, becoming one of the fundamental ingredients of personal wellbeing.

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1.2. The Big Five Model or Five Factor Model

The Big Five Model was primarily consolidated using contributions from Costa and McCrae's Five Factor Model (FFM), (Costa & McCrae, 1992; McCrae & Costa, 1987), focussing on the following traits: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. This model could be considered as an example of a nomothetic approach to the study of personality as it refers to the dimensions in which individuals differ (Winter, 1996), in contrast to the idiographic approach to the organisation and structure of personality in which individual idiosyncrasies are taken into account (Grant & Langan-Fox, 2006).

It must be noted that, in our study, the instrument used to assess the big five considers emotional stability instead of neuroticism. Therefore, although in the theoretical review we consider neuroticism, in Sections 3 and 4 we use the concept of emotional stability, at the opposite pole.

Recent studies have dealt with the relationship between the dimensions of the FFM and specific aspects of the response to stress, coping strategies, and the evaluation of stressful situations (Penley & Tomaka, 2002). The FFM predicts a differential use of coping strategies in response to stress. For example, neuroticism predicts strategies such as avoidance or hostile reactions (Watson & Hubbard, 1996), while conscientiousness is more closely related to strategies focussing on the problem, such as planning (O'Brien & DeLongis, 1996). Other studies have focussed on the combined role of various traits, for example high levels of extraversion and conscientiousness predict coping strategies which focus more on the problem than other combinations (Grant & Langan-Fox, 2006).

Penley and Tomaka (2002) highlight that neuroticism is associated with the perception of a lesser ability to cope and greater levels of negative emotions, such as anxiety or fear; extraversion is positively linked to happiness and personal satisfaction, and negatively with stress; agreeableness is associated with happiness and coping strategies centred on emotion; and conscientiousness is associated with the perception of capability to cope with situational demands.

Therefore, the FFM is widely used although it is not exempt from criticism. For example, a prominent critic is Cervone (2004), who highlights that the model does not specify the dynamic processes implicated in personality structures.

1.3. Work effort

Work effort is an important aspect in the lives of human beings, affecting as much quality of life as work performance. The concept of effort has been linked to various theories of motivation but has not been studied as an independent concept in its own right (De Cooman, De Gieter, Pepermans, Jegers, & Van Acker, 2009). Therefore, there is a lack of information in psychological research into this concept.

A lack of work effort can be related to poorer performance in the workplace and greater levels of fatigue; this has been defined as a generalised feeling of tiredness or lack of energy which is not exclusively linked to excessive effort (Brown & Schutte, 2006). In the study of fatigue, the importance as much of physical factors as psychosocial factors has been proven (Brown & Schutte, 2006). Despite the recognised significance of fatigue on human wellbeing, there is a little research which has explored this construct within psychological literature (Arpin-Cribbie & Cribbie, 2007).

1.4. Theoretical proposal

This study is based on the hypothesis that the components of hardiness (challenge, control, and commitment) can perform a moderating role between stable personality traits and responses in work effort when confronted with stress in the workplace.

This hypothesis is based on the theoretical focus of the hierarchical organisation of personality. Little (2006) claims that the first level (Tier I) includes traits such as those included in the FFM, and a second level (Tier II) corresponding to personal projects, life tasks, and personal effort. In this sense, the elements of hardiness (challenge, commitment, and control) convey a greater level of precision in the hierarchical structure of personality and a greater capacity to manage these kinds of variables by the subject, leaving a margin for intervention programmes in various fields of applied psychology. Therefore, hardiness could perform a moderating role between more stable personality traits and work effort in response to stress.

This position is linked to the controversy in the study of personality between structures and processes. Socio-cognitive theories, in contrast to traditional theories, do not explicitly distinguish between procedural and structural variables. "Individual constructs may refer as much to dynamic processes as to stable structures" (Cervone, 2004, p. 185). The KAPA (Knowledge-Appraisal Personality Architecture) model fits within this theory, which also addresses the duality between processes and structure (Cervone, 2004), and the Cognitive-Affective Personality System (CAPS) by Mischel and Shoda (1995), which considers personality as a complex organisation of dynamic cognitive and affective elements. The evaluation of personality leads to the construction of types based on differential dynamic processes which are, in essence, linked to the specific situations in which they are expressed (Mischel, 2004). According to this argument, the dimensions of hardiness could be considered as much as processes as structure. Meanwhile, other authors (Tomaka, Blascovich, Kibler, & Ernst, 1997) have identified two types of evaluation linked to stress: evaluations of threat and evaluations of challenge, clearly placing the dimensions of hardiness at the process level, meaning it could, therefore, perform a moderating role.

Finally, we would like to point out that this study does not attempt to definitively place the dimensions of hardiness or establish the bases of a theoretical foundation in which the traits of the FFM are considered as structure (knowledge) and hardiness is more closely linked to processes (appraisal). We wish to highlight that previous studies have attempted to discover how high level variables can perform a moderating role (understood as a moderator of consistency) against other variables also considered to be high level (Hofstee & De Raad, 1992).

1.5. Objective and hypothesis

The objective of this study is to investigate the moderating role of hardiness among the stable personality traits and responses in effort when faced with stress in the workplace. It aims to determine whether hardiness, either globally or in certain of its dimensions, affects the intensity of the relationship between personality structure (predictor variable) and work effort (criterion variable). A void in this line of investigation was noted in the literature review carried out.

The hypotheses of the study are as follows:

Hypothesis 1. People with a high level of extraversion, emotional stability, conscientiousness, agreeableness, and openness employ a greater level of work effort in response to stressful situations than those with a low level of the same traits.

Hypothesis 2. Hardiness (overall, commitment, challenge and control) will perform a moderating role among the personality traits of the FFM (extraversion, emotional stability, conscientiousness, agreeableness and openness) and responses in work effort, in that the relationship between the FFM and effort will become less intense if the level of hardiness is greater and vice versa.

2. Method

2.1. Participants

An incidental Spanish multi-occupational sample participated in this study. Data were collected during the years 2012 and 2013. The range of occupations varied from industry to education or social services. The total number of participants was 403 (53.8% women). Mean age was 39.5 (s.d. = 12.39). Civil status distribution was: married (58.1%), single (35.2%), divorced (5.2%), and widowed (1.5%). Subjects were encouraged to participate in a study about responses to stress and were informed of the objectives of the research, to investigate the links between personality variables and certain responses to stress demands. Participation in the study was voluntary and participants were given the opportunity to maintain contact with the research team in order to follow up on the results obtained, and to have the possibility to participate in further follow-up studies.

2.2. Measures

2.2.1. The Hardiness Scale

This instrument was created to assess the role of hardiness as moderator of the relationship between job stressors and burnout. This instrument consists of 21 items (e.g. "things are achieved only with personal effort") grouped within three factors: commitment, challenge, and control. Internal consistency values range from .75 for the control dimension to .86 for the global score, challenge and commitment factors both reached a value of .81 (Moreno-Jiménez, Garrosa, & González, 2000). Items are answered through a Likert-type scale ranging from 1 (completely disagree) to 4 (completely agree). Furthermore, the scale allows for a global score on hardiness to be obtained. A high score means more hardiness for the three components.

2.2.2. The Overall Personality Assessment Scale (OPERAS)

This questionnaire consists of 40 items (e.g., "I feel comfortable with myself"), and is based on the model of the Big Five factors of personality: extraversion, emotional stability, agreeableness, conscientiousness and openness to experience (Costa & McCrae, 1992; McCrae & Costa, 1987). As we mentioned before, it must be taken into account that, in this instrument, emotional stability is assessed instead of neuroticism. In relation to the psychometric characteristics, the results found show an adequate goodness-of-fit to the Five Factor Model. The reliability values of the factors obtained in previous studies (Vigil-Colet, Morales-Vives, Camps, Tous, & Lorenzo-Seva, 2013) through Cronbach's alpha coefficient are as follows: .86 for extraversion and emotional stability, .77 for conscientiousness, .71 for agreeableness, and .81 for openness to experience.

The first dimension is extraversion/introversion and is concerned with the degree to which an individual is talkative and sociable. Emotional stability/neuroticism refers to the degree to which a person is secure and autonomous. Agreeableness/hostility relates to the level to which a person trusts others, is tolerant and flexible. Conscientiousness/lack of conscientiousness is concerned with the degree to which a person is organised and tenacious in the goals he or she wishes to achieve. Finally, openness to experience is concerned with a person's level of intellect and the degree to which he or she is intuitive and curious.

Items are assessed on a Likert-type scale with options ranging from 1 (completely disagree) to 5 (completely agree). A high score means more of that trait for the five components.

2.2.3. The Work Effort Scale (WESC)

This tool is a self-report 10-item scale (e.g. "I think of myself as a hard worker"). The instrument was initially created with the intention to assess precisely the work effort (De Cooman et al., 2009). Although effort appeared in some theories of motivation, its evaluation as an independent concept had not previously been studied. Data from several samples has confirmed the three-factor structure (persistence, direction, and intensity) of the WESC through confirmatory factor analysis. Furthermore, reliability is well documented. Positive correlations between self-rated performance and global job satisfaction scales and work effort scores have been found. Items are rated on a Likert-type scale with options ranging from 1 (completely disagree) to 7 (completely agree). A high score means more work effort.

2.3. Statistical analyses

Data analyses were carried out through the statistical package SPSS 19.0. Reliability was obtained through Cronbach's alpha value, while Pearson's correlation coefficient was used for the analysis of the relationship between the FFM, hardiness and fatigue. A series of stepwise hierarchical multiple regression analyses were performed to examine the moderation of hardiness (Z) on the relationships between FFM (X) and fatigue (Y) (see Cohen, Cohen, West, & Aiken, 2003). Prior to the computation of the interaction terms (XZ), the independent measures (X, Z) were mean centred to deal with problems of multicollinearity (Kleinbaum, Kupper, & Muller, 1988). The main predictor variables in the first step were centred and the interaction term in the second step. To establish the relevance of the interaction effect, according to Cohen (1992), an increase of explained variance (ΔR^2) of .02 indicates a good effect size. In order to interpret the results, an analysis of simple effects (simple slope of simple regression equations, Aiken & West, 1991) was carried out and the hypothesis was tested that a simple slope differs from zero. Three values were selected that are: one standard deviation above the mean (high, β_H), equal to the mean (β_M), and one standard deviation below the mean (low, β_L) of hardiness. Graphics of simple slopes were also made to facilitate interpretation (Aiken & West, 1991).

3. Results

3.1. Reliability analysis

As can be seen in Table 1, all of the instruments used showed adequate indices of internal consistency evaluated using Cronbach's alpha coefficient. The minimum value was .73, corresponding to the control dimension of hardiness, and the

Table 1
Descriptive statistics and reliability values with Cronbach's alpha coefficient.

Variable	Minimum	Maximum	Mean	SD	α
Hardiness (total)	5	12	9.66	1.170	.88
Hardiness (commitment)	2	4	3.30	−.465	.78
Hardiness (challenge)	2	4	3.20	.504	.84
Hardiness (control)	2	4	3.15	.453	.73
WESC (total)	10	70	62.61	8.050	.92
WESC (persistence)	3	21	18.26	2.964	.73
WESC (direction)	3	21	19.27	2.370	.86
WESC (intensity)	4	28	25.09	3.601	.92
Extraversion	18	71	46.50	9.525	.86*
Emotional stability	16	74	48.33	8.778	.86*
Conscientiousness	27	69	49.86	8.856	.77*
Agreeableness	17	75	50.06	9.459	.71*
Openness	20	71	49.20	9.752	.81*

* Data collected from previous research.

persistence of the WESC, while the maximum value of internal consistency was .92, corresponding to the WESC global scores.

3.2. Correlation analyses

Work effort is evaluated through the WESC. In this instrument, a high score indicates greater effort and therefore it is expected that the correlations between variables and the WESC scores will be positive. The results corresponding to the first hypothesis, shown in Table 2, are favourable as positive correlations between the personality traits of the FFM and scores corresponding to effort, evaluated on the WESC, were obtained. Concretely, it has been determined that there is a positive relationship between WESC scores and extraversion ($r = .10$, $p < .05$); between WESC scores and emotional stability ($r = .21$, $p < .01$); between conscientiousness and the overall WESC score ($r = .43$, $p < .01$) and between agreeableness and WESC scores ($r = .19$, $p < .01$). Finally, a positive and statistically significant correlation was obtained between openness and the overall WESC score ($r = .16$, $p < .01$).

3.3. Analysis of the moderator effect

The results corresponding to the moderator effect of hardiness are displayed in Table 3. Only the overall results for the global work effort are presented as the results for the dimensions were very similar.

The second hypothesis, corresponding to the moderating role of hardiness in the relationship between the traits of the FFM and responses in work effort, can be confirmed in the cases of conscientiousness ($\beta_{xz} = -.210$, $\Delta R^2 = .043$, $p < .001$), agreeableness ($\beta_{xz} = -.094$, $\Delta R^2 = .009$, $p < .05$) and openness ($\beta_{xz} = -.160$, $\Delta R^2 = .025$, $p < .001$). The negative symbol in the interaction coefficients (β_{xz}) indicates that the intensity of the relationship diminishes as the level of hardiness increases. The analysis of simple effects shows that the slopes are statistically different from zero in low (β_L) and medium (β_M) values of hardiness, but not in high values (β_H), in the three traits: conscientiousness ($\beta_L = .44$, $\beta_M = .25$, $\beta_H = .06$), agreeableness ($\beta_L = .23$, $\beta_M = .14$, $\beta_H = .05$) and openness ($\beta_L = .26$, $\beta_M = .11$, $\beta_H = -.04$). Therefore, there is a relationship between these stable personality traits and effort when workers have a low or medium level of hardiness. However, the relationship disappears when the level of hardiness is high in the conscientiousness dimension (see Fig. 1).

On the other hand, in the case of extraversion and emotional stability, the interaction is not significant; although, on a descriptive level, the same trend as the previous dimensions can be appreciated. The interaction coefficients display negative values (extraversion, $\beta_{xz} = -.052$; emotional stability, $\beta_{xz} = -.071$) and the coefficients of the simple slopes show decreasing values (extraversion, $\beta_L = .07$, $\beta_M = .02$, $\beta_H = -.03$; emotional stability, $\beta_L = .16$, $\beta_M = .09$, $\beta_H = -.02$), the relationship between emotional stability and effort in workers with low levels of hardiness also being significant.

In terms of the dimensions of hardiness, the results show that commitment clearly performs a moderating role in all dimensions except extraversion. The interaction coefficients are statistically significant in emotional stability ($\beta_{xz} = -.096$, $\Delta R^2 = .009$, $p < .05$) conscientiousness ($\beta_{xz} = -.220$, $\Delta R^2 = .046$, $p < .001$), agreeableness ($\beta_{xz} = -.104$, $\Delta R^2 = .011$, $p < .05$) and openness ($\beta_{xz} = -.117$, $\Delta R^2 = .014$, $p < .05$). In the case of extraversion, the coefficients of the simple slopes show decreasing values ($\beta_L = .11$, $\beta_M = .02$, $\beta_H = -.08$).

In relation to the challenge factor, the interaction is statistically significant in the factors of conscientiousness ($\beta_{xz} = -.196$, $\Delta R^2 = .037$, $p < .001$), and openness ($\beta_{xz} = -.113$, $\Delta R^2 = .013$, $p < .05$). With the other three factors, extraversion, emotional stability and agreeableness, although the effect of the interaction is not significant, the decreasing value of the simple effects is confirmed.

Finally, in terms of the control factor, the behaviour is very similar to the previous, confirming the hypothesis in two factors of the FFM: conscientiousness ($\beta_{xz} = -.101$, $\Delta R^2 = .010$, $p < .05$), and openness ($\beta_{xz} = -.164$, $\Delta R^2 = .017$, $p < .001$). Detailed results can be observed in Table 3.

4. Discussion

The principal objective of this study was to investigate the possible moderating role of hardiness between stable personality traits and responses in work effort when confronted with stress. Firstly, it should be noted that the first hypothesis proposed in the research was upheld, which refers to the correlations between the dimensions of the FFM and work effort. The research confirms that people with a high level of the extraversion, emotional stability, conscientiousness, agreeableness, and openness personality traits in the FFM show a greater level of effort in reaction to stressful situations than those with low levels of these traits.

In terms of the second hypothesis, the aim was to test whether hardiness affects the intensity of the relationship between personality structure, measured using the FFM (predictor variable), and work effort (criterion variable). That is to say, the objective was to determine whether, while taking into account that certain factors of personality structure affect work effort, people with high levels of hardiness would tend to show greater work effort. The

Table 2
Correlations between hardiness, work effort and the FFM.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Hardiness (total)													
2. Hardiness(commitment)	.85**												
3. Hardiness (challenge)	.84**	.62**											
4. Hardiness (control)	.77**	.48**	.44**										
5. WESC (total)	.47**	.49**	.40**	.26**									
6. WES (persistence)	.38**	.38**	.33**	.22**	.89**								
7. WESC (direction)	.39**	.40**	.32**	.21**	.90**	.74**							
8. WESC (intensity)	.48**	.52**	.39**	.27**	.91**	.67**	.73**						
9. Extraversion	.15**	.14**	.15**	.08	.10*	.05	.11*	.11*					
10. Emotional stability	.25**	.20**	.23**	.16**	.21**	.20**	.23**	.14**	.35**				
11. Conscientiousness	.36**	.35**	.35**	.18**	.43**	.40**	.37**	.39**	.19**	.41**			
12. Agreeableness	.12**	.14**	.09	.06	.19**	.16**	.18**	.17**	−.04	.31**	.20**		
13. Openness	.10	.11*	.21**	−.08	.16**	.19**	.13**	.11**	.07	.07	.14**	.04	

* $p < .05$.
** $p < .01$.

Table 3
Analysis of the moderator effect of hardiness between the FFM and work effort.

	Hierarchical multiple regression					Simple effects		
	Step 1			Step 2				
	β_x	β_z	R^2	β_{xz}	ΔR^2	β_L	β_M	β_H
Hardiness-T								
Extraversion	.016	.463***	.217***	−.052	.003	.07	.02	−.03
Emotion. stability	.078	.447***	.222***	−.071	.005	.16*	.09	.02
Conscientiousness	.259***	.370***	.275***	−.210***	.043***	.44***	.25***	.06
Agreeableness	.135**	.449***	.234***	−.094*	.009*	.23***	.14**	.05
Openness	.123*	.452***	.231***	−.160***	.025***	.26***	.11*	−.04
Commitment								
Extraversion	.017	.493***	.246***	−.090	.008	.11	.02	−.08
Emotion. stability	.096*	.478***	.255***	−.096*	.009*	.21**	.11*	.01
Conscientiousness	.265***	.398***	.307***	−.220***	.046***	.47***	.26***	.05
Agreeableness	.131**	.478***	.262***	−.104*	.011*	.24***	.14**	.03
Openness	.117*	.483***	.259***	−.117*	.014*	.22***	.11*	.00
Challenge								
Extraversion	.042	.384***	.153***	−.027	.001	.07	.04	.02
Emotion. stability	.108*	.366***	.163***	−.042	.002	.15*	.11*	.07
Conscientiousness	.307***	.280***	.234***	−.196***	.037**	.50***	.31***	.13*
Agreeableness	.155**	.373***	.175***	−.069	.005	.22***	.16***	.10
Openness	.080	.371***	.158***	−.113*	.013*	.17***	.07	−.03
Control								
Extraversion	.053	.251***	.068***	−.039	.002	.09	.05	.02
Emotion. stability	.153**	.232***	.088***	−.021	.001	.18*	.16*	.13
Conscientiousness	.365***	.187***	.194***	−.101*	.010*	.45***	.36***	.27***
Agreeableness	.174***	.246***	.096***	.003	.001	.17*	.17**	.18**
Openness	.187***	.269***	.101***	−.164***	.027***	.35***	.18***	.02

Note: β_x = Big Five dimensions (BF); β_z = hardiness (H); β_{xz} = interaction BF and H; R^2 = variance explained by BF and H; ΔR^2 = increment of variance explained by the interaction; β_L = −1 standard deviation, β_M = mean, β_H = +1 standard deviation.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

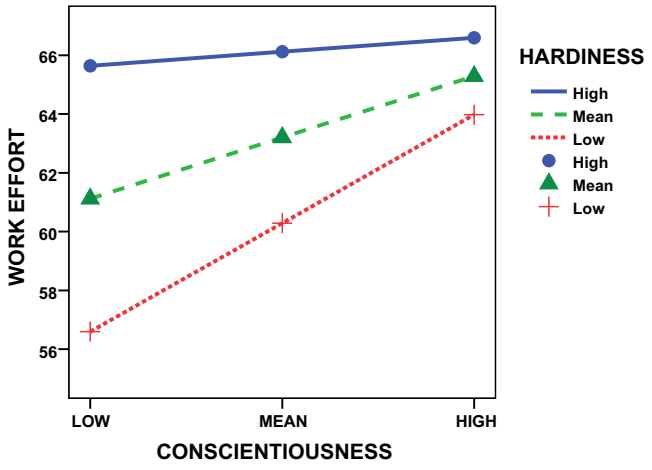

Fig. 1. Moderator effect of hardiness in the relation between conscientiousness and work effort.

results obtained confirm that hardiness does have a significant moderating effect in the case of three factors in the FFM (conscientiousness, agreeableness and openness) and their relationship with effort. Of the three factors of hardiness, the commitment factor behaves best as it performs a significant moderating role in the relationship of four factors of the FFM: emotional stability, conscientiousness, agreeableness and openness.

From these results, two noteworthy conclusions can be drawn. Firstly, the hardiness factor which behaves best as a moderator is commitment, given that it moderates the relationship between four factors of the FFM and work effort. This result is greatly relevant to workplace intervention as, if means are provided for workers to have greater commitment, for example through the promotion of engagement or participation in decision making, it is probable that they will display a greater level of work effort when confronted with stress. In this sense, a future line of research would be to test the effect of engagement on levels of effort and fatigue.

In terms of the factors of the FFM, those which most resist the moderating effect of hardiness are extraversion and emotional stability, perhaps because their effect on effort is so pronounced that it cancels any possible moderating effect.

By way of conclusion to the study, it can be stated that, even taking into account that certain stable factors of personality structure such as those in the FFM can affect work effort, people with high levels of hardiness employ greater effort and, as a result, experience less work fatigue. As mentioned in the introduction, three elements of hardiness: challenge, commitment and control were considered implying a greater capacity of the subject to manage these types of variables, leaving a margin for intervention through programmes to improve these personal capacities at the workplace.

Among the future lines of investigation related to the findings, one line of research could be the replication of these results in educational and clinical contexts, as well as to explore gender-related differences on the moderator role of hardiness. Another line could be to carry out a longitudinal study of the maintenance of hardiness as a moderator over time with the sample used in this research.

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